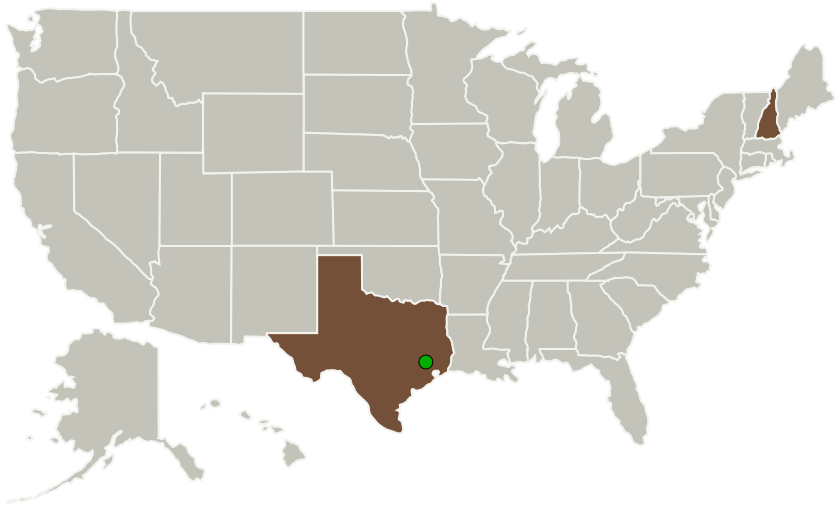
A Robust, Gravity-Insensitive, High-Temperature Condenser, Phase I

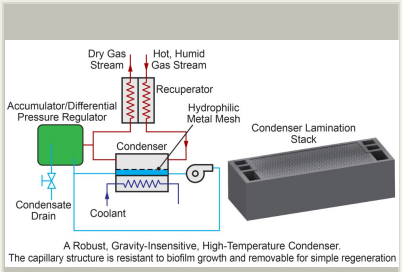
Completed Technology Project (2015 - 2015)

Project Introduction

Regenerative life support systems and in situ resource utilization systems are vital for NASA's future space exploration missions to maximize self-sufficiency and minimize the resupply of consumables. One of the critical needs for these systems is a gravity-insensitive condenser to collect water in a high-temperature gas stream from these systems, as requested by Topic H03.3. To this end, Creare proposes to develop a gravity-insensitive, high-temperature condenser. The condenser has capillary structures to cool the gas stream, separate the condensate, and drain the liquid water. The condenser has design features to ensure its operation is insensitive to gravity. The entire condenser is constructed from metals that have excellent resistance to chemical attack from contaminants and biofilm growth, and are suitable for operating at high temperature. The capillary structures in the condenser are removable and can be regenerated during scheduled maintenance if it becomes necessary. The proposed condenser builds on the gravity-insensitive phase separator technology Creare developed for aircraft applications. In Phase I, Creare will design, build, and demonstrate a proof-of-concept condenser. In Phase II, Creare will build and characterize a laboratory condenser for a specific target mission and deliver it to NASA for further performance characterization.

Primary U.S. Work Locations and Key Partners





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Completed Technology Project (2015 - 2015)

Organizations Performing Work	Role	Type	Location
Creare LLC	Lead Organization	Industry	Hanover, New Hampshire
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
New Hampshire	Texas

Project Transitions

June 2015: Project Start

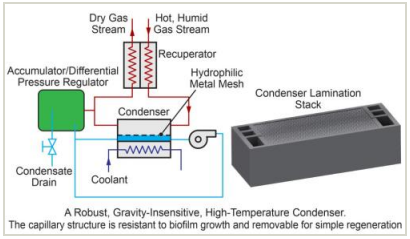
December 2015: Closed out

Closeout Summary: A Robust, Gravity-Insensitive, High-Temperature Condenser, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/138754)*

Images



Briefing Chart Image
A Robust, Gravity-Insensitive, High-Temperature Condenser, Phase I
(https://techport.nasa.gov/image/131803)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Creare LLC

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

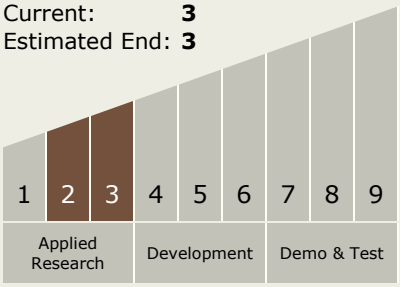
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Weibo Chen

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



A Robust, Gravity-Insensitive, High-Temperature Condenser, Phase I

Completed Technology Project (2015 - 2015)

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
    - TX06.1.1 Atmosphere Revitalization

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System